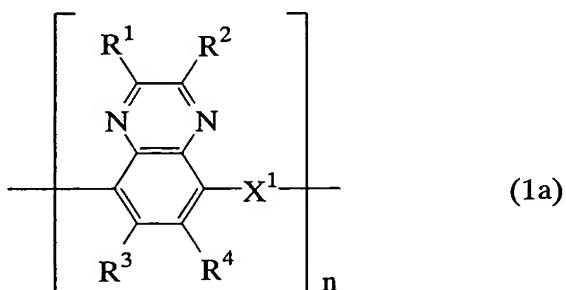


CLAIMS:

1. An electrode for an energy storage device comprising a polyaminoquinoxaline compound of the following formula (1a) as an electrode active material,

[Chemical Formula 1]



wherein  $R^1$  and  $R^2$  independently represent a hydrogen atom, a hydroxyl group, a  $C_1$ - $C_{10}$  alkyl group, a  $C_1$ - $C_{10}$  alkoxy group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y provided that when  $R^1$  and  $R^2$  are, respectively, the above-defined phenyl, pyridyl, biphenyl, naphthyl, thienyl, pyrrolyl, furyl or condensed heteroaryl group, these groups may be joined through a single bond;

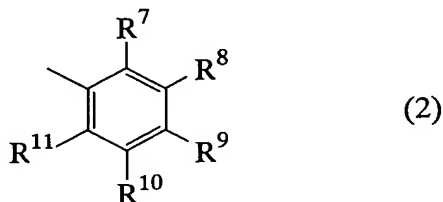
$R^3$  and  $R^4$  independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, a  $C_1$ - $C_{10}$  alkyl group, a  $C_1$ - $C_{10}$  alkoxy group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y provided that when  $R^3$  and  $R^4$

are, respectively, the above-defined phenyl, pyridyl, biphenyl, naphthyl, thienyl, pyrrolyl, furyl or condensed heteroaryl group, these groups may be joined through a single bond;

5           X<sup>1</sup> represents -NH-R<sup>5</sup>-NH- or -NH-R<sup>6</sup>- wherein R<sup>5</sup> and R<sup>6</sup> independently represent a C<sub>1</sub>-C<sub>10</sub> alkylene group, a -C(O)CH<sub>2</sub>-, -CH<sub>2</sub>C(O)-, a divalent benzene ring which may be substituted with Y, a divalent pyridine ring which may be substituted with Y, a divalent biphenyl group which may be substituted  
10 with Y, a divalent naphthalene ring which may be substituted with Y, a divalent thiophene ring which may be substituted with Y, a divalent pyrrole ring which may be substituted with Y, a furan ring which may be substituted with Y, or a condensed hetero ring which may be substituted with Y, in  
15 which Y represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted  
20 with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrrolyl group which may be substituted with Z, a furyl group which may be substituted with Z or a condensed heteroaryl group which may  
25 be substituted with Z provided that if Y is two or more in number, Y may be the same or different, in which Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl  
30 group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group provided that if Z is two or more in number, Z may be the same or different; and

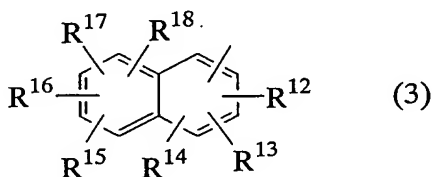
n is an integer of 2 or over.

2. The electrode according to claim 1, wherein R<sup>1</sup> and R<sup>2</sup> independently represent a group of the following formula (2)  
[Chemical Formula 2]



5 wherein R<sup>7</sup>-R<sup>11</sup> independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>4</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>4</sub> cyanoalkyl group, a phenyl group which may be substituted with Z, a  
10 naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z, in which Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl  
15 group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group.

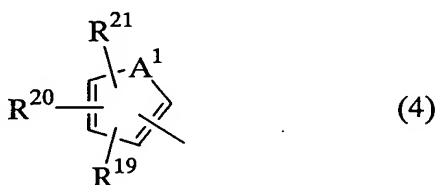
3. The electrode according to claim 1, wherein R<sup>1</sup> and R<sup>2</sup>  
20 independently represent a group of the following formula (3)  
[Chemical Formula 3]



wherein R<sup>12</sup>-R<sup>18</sup> independently represent, each substituted at  
an arbitrary position of the ring of the formula, a hydrogen  
25 atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted

with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z, in which Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group.

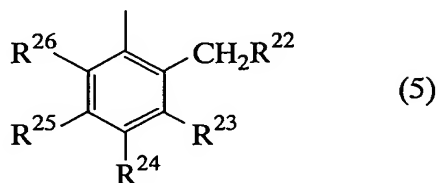
4. The electrode according to claim 1, wherein R<sup>1</sup> and R<sup>2</sup> independently represent a group of the following formula (4)  
[Chemical Formula 4]



wherein R<sup>19</sup>-R<sup>21</sup> independently represent, each substituted at an arbitrary position of the ring of the formula, a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z, in which Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group; and

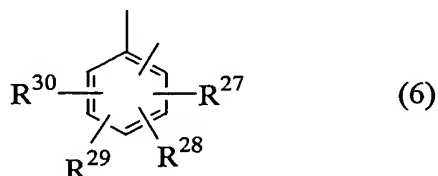
A<sup>1</sup> represents NH, O or S.

5. The electrode according to claim 1, wherein R<sup>1</sup> and R<sup>2</sup> independently represent a group of the following formula (5)  
[Chemical Formula 5]



5 wherein R<sup>22</sup> represents a halogen atom or a cyano group, and R<sup>23</sup>-R<sup>26</sup> independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted with Z, a  
10 naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z, in which Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl  
15 group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group.

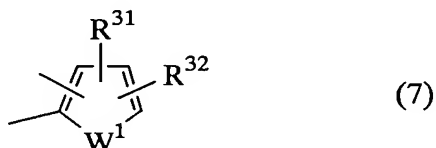
6. The electrode according to any one of claims 1 to 5,  
20 wherein R<sup>5</sup> represents a group of the following formula (6)  
[Chemical Formula 6]



wherein R<sup>27</sup>-R<sup>30</sup> independently represent, each substituted at an arbitrary position on the ring of the formula, a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted  
25 with Z, a naphthyl group which may be substituted with Z or a

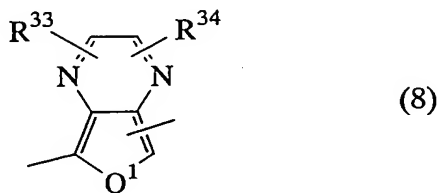
thienyl group which may be substituted with Z, in which Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group.

7. The electrode according to any one of claims 1 to 5, wherein R<sup>5</sup> represents a group of the following formula (7)  
[Chemical Formula 7]



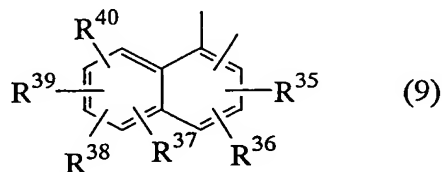
- wherein R<sup>31</sup>-R<sup>32</sup> independently represent, each substituted at an arbitrary position on the ring of the formula, a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z, in which Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group; and  
W<sup>1</sup> represents NH, O or S.

8. The electrode according to any one of claims 1 to 5,  
wherein R<sup>5</sup> represents a group of the following formula (8)  
[Chemical Formula 8]



5 wherein R<sup>33</sup>-R<sup>34</sup> independently represent, each substituted at  
an arbitrary position on the ring of the formula, a hydrogen  
atom, a halogen atom, a cyano group, a nitro group, an amino  
group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a  
C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted  
10 with Z, a naphthyl group which may be substituted with Z or a  
thienyl group which may be substituted with Z, in which Z  
represents a halogen atom, a cyano group, a nitro group, an  
amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl  
group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub>  
15 cyanoalkyl group, a phenyl group, a biphenyl group, a  
naphthyl group, a thienyl group, a pyrrolyl group, a furyl  
group or a condensed heteroaryl group; and  
Q<sup>1</sup> represents NH, O or S.

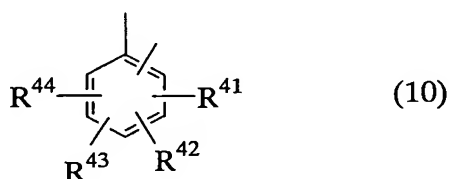
20 9. The electrode according to any one of claims 1 to 5,  
wherein R<sup>5</sup> represents a group of the following formula (9)  
[Chemical Formula 9]



25 wherein R<sup>35</sup>-R<sup>40</sup> independently represent, each substituted at  
an arbitrary position on the ring of the formula, a hydrogen  
atom, a halogen atom, a cyano group, a nitro group, an amino  
group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a  
C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted

with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z, in which Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group.

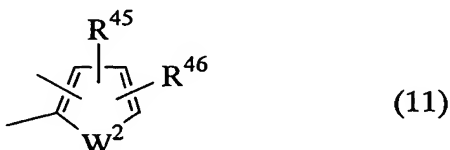
- 10 10. The electrode according to any one of claims 1 to 5, wherein R<sup>6</sup> represents a group of the following formula (10)  
[Chemical Formula 10]



- wherein R<sup>41</sup>-R<sup>44</sup> independently represent, each substituted on  
15 an arbitrary position of the ring of the formula, a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a  
20 thienyl group which may be substituted with Z, in which Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a  
25 naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group.

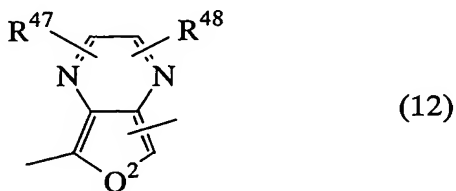


11. The electrode according to any one of claims 1 to 5,  
wherein R<sup>6</sup> represents a group of the following formula (11)  
[Chemical Formula 11]



5 wherein R<sup>45</sup>-R<sup>46</sup> independently represent, each substituted on  
an arbitrary position of the ring of the formula, a hydrogen  
atom, a halogen atom, a cyano group, a nitro group, an amino  
group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a  
C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted  
10 with Z, a naphthyl group which may be substituted with Z or a  
thienyl group which may be substituted with Z, in which Z  
represents a halogen atom, a cyano group, a nitro group, an  
amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl  
group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub>  
15 cyanoalkyl group, a phenyl group, a biphenyl group, a  
naphthyl group, a thienyl group, a pyrrolyl group, a furyl  
group or a condensed heteroaryl group; and  
W<sup>2</sup> represents NH, O or S.

20 12. The electrode according to any one of claims 1 to 5,  
wherein R<sup>6</sup> represents a group of the following formula (12)  
[Chemical Formula 12]

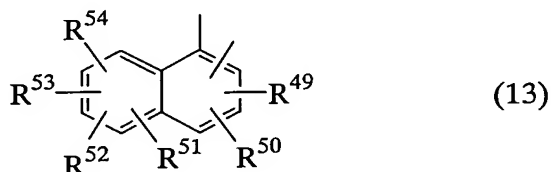


25 wherein R<sup>47</sup>-R<sup>48</sup> independently represent, each substituted on  
an arbitrary position of the ring of the formula, a hydrogen  
atom, a halogen atom, a cyano group, a nitro group, an amino  
group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a  
C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted

with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z, in which Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group; and  
 Q<sup>2</sup> represents NH, O or S.

10

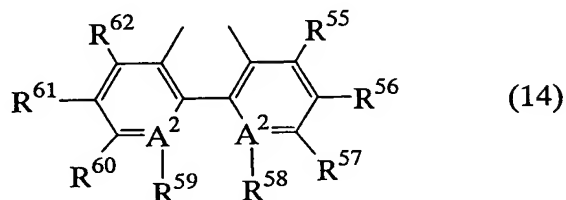
13. The electrode according to any one of claims 1 to 5, wherein R<sup>6</sup> represents a group of the following formula (13)  
 [Chemical Formula 13]



15 wherein R<sup>49</sup>-R<sup>54</sup> independently represent, each substituted on an arbitrary position of the ring of the formula, a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted  
 20 with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z, in which Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a  
 25 naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group.

14. The electrode according to claim 1, wherein the group formed by bonding  $R^1$  and  $R^2$  through a single bond is represented by the formula (14)

[Chemical Formula 14]

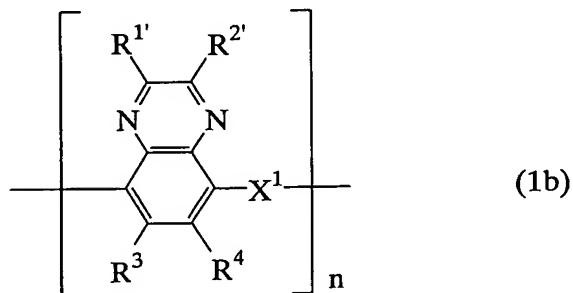


5

wherein  $A^2$ 's are each C or N,  $R^{55}$ - $R^{62}$  independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a  $C_1$ - $C_{10}$  alkyl group, a  $C_1$ - $C_{10}$  alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z, in which Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a  $C_1$ - $C_{10}$  alkyl group, a  $C_1$ - $C_{10}$  haloalkyl group, a  $C_1$ - $C_{10}$  alkoxy group, a  $C_1$ - $C_{10}$  cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group, provided that when  $A^2$  represents N,  $R^{58}$  and  $R^{59}$  are both non-existent.

15. An electrode for an energy storage device comprising a polyaminoquinoxaline compound of the following formula (1b) as an electrode active material

[Chemical Formula 15]



wherein  $R^1$  and  $R^2$  join together to form  $-\text{CH}_2\text{CH}_2\text{CH}_2-$ ,  $-\text{CH}_2\text{CH}_2\text{O}-$ ,  
 $-\text{OCH}_2\text{CH}_2-$ ,  $-\text{CH}_2\text{OCH}_2-$ ,  $-\text{OCH}_2\text{O}-$ ,  $-\text{CH}_2\text{CH}_2\text{S}-$ ,  $-\text{SCH}_2\text{CH}_2-$ ,  $-\text{CH}_2\text{SCH}_2-$ ,  
 $-\text{CH}_2\text{CH}_2\text{N}(R^1)-$ ,  $-\text{N}(R^1)\text{CH}_2\text{CH}_2-$ ,  $-\text{CH}_2\text{N}(R^1)\text{CH}_2-$ ,  $-\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2-$ ,  
 $-\text{CH}_2\text{CH}_2\text{CH}_2\text{O}-$ ,  $-\text{OCH}_2\text{CH}_2\text{CH}_2-$ ,  $-\text{CH}_2\text{CH}_2\text{OCH}_2-$ ,  $-\text{CH}_2\text{OCH}_2\text{CH}_2-$ ,  $-\text{CH}_2\text{OCH}_2\text{O}-$ ,  
5  $-\text{OCH}_2\text{CH}_2\text{O}-$ ,  $-\text{SCH}_2\text{CH}_2\text{S}-$ ,  $-\text{OCH}_2\text{CH}_2\text{S}-$ ,  $-\text{SCH}_2\text{CH}_2\text{O}-$ ,  $-\text{CH}_2\text{CH}=\text{CH}-$ ,  
 $-\text{CH}=\text{CHCH}_2-$ ,  $-\text{OCH}=\text{CH}-$ ,  $-\text{CH}=\text{CHO}-$ ,  $-\text{SCH}=\text{CH}-$ ,  $-\text{CH}=\text{CHS}-$ ,  
 $-\text{N}(R^1)\text{CH}=\text{CH}-$ ,  $-\text{CH}=\text{CHN}(R^1)-$ ,  $-\text{OCH}=\text{N}-$ ,  $-\text{N}=\text{CHO}-$ ,  $-\text{SCH}=\text{N}-$ ,  
 $-\text{N}=\text{CHS}-$ ,  $-\text{N}(R^1)\text{CH}=\text{N}-$ ,  $-\text{N}=\text{CHN}(R^1)-$ ,  $-\text{N}(R^1)\text{N}=\text{CH}-$ ,  $-\text{CH}=\text{N}(R^1)\text{N}-$ ,  
 $-\text{CH}=\text{CHCH}=\text{CH}-$ ,  $-\text{OCH}_2\text{CH}=\text{CH}-$ ,  $-\text{CH}=\text{CHCH}_2\text{O}-$ ,  $-\text{N}=\text{CHCH}=\text{CH}-$ ,  
10  $-\text{CH}=\text{CHCH}=\text{N}-$ ,  $-\text{N}=\text{CHCH}=\text{N}-$ ,  $-\text{N}=\text{CHN}=\text{CH}-$ , or  $-\text{CH}=\text{NCH}=\text{N}-$  wherein a  
hydrogen atom bonded to a carbon atom of these groups may be  
substituted with Y, and  $R^1$  represents a hydrogen atom, a  
 $\text{C}_1$ - $\text{C}_{10}$  alkyl group, a  $\text{C}_1$ - $\text{C}_{10}$  haloalkyl group, a  $\text{C}_1$ - $\text{C}_{10}$   
cyanoalkyl group, a phenyl group which may be substituted  
15 with Z, a pyridyl group which may be substituted with Z, a  
biphenyl group which may be substituted with Z, a naphthyl  
group which may be substituted with Z, a thienyl group which  
may be substituted with Z, a pyrrolyl group which may be  
substituted with Z, a furyl group which may be substituted  
20 with Z, or a condensed heteroaryl group which may be  
substituted with Z;

$R^3$  and  $R^4$  independently represent a hydrogen atom, a  
halogen atom, a cyano group, a nitro group, an amino group, a  
 $\text{C}_1$ - $\text{C}_{10}$  alkyl group, a  $\text{C}_1$ - $\text{C}_{10}$  alkoxy group, a phenyl group which  
25 may be substituted with Y, a pyridyl group which may be  
substituted with Y, a biphenyl group which may be substituted  
with Y, a naphthyl group which may be substituted with Y, a  
thienyl group which may be substituted with Y, a pyrrolyl  
group which may be substituted with Y, a furyl group which  
30 may be substituted with Y or a condensed heteroaryl group  
which may be substituted with Y provided that when  $R^3$  and  $R^4$   
are, respectively, the above-defined phenyl, pyridyl,  
biphenyl, naphthyl, thienyl, pyrrolyl, furyl or condensed  
heteroaryl group, these groups may be joined through a single  
35 bond; and

$X^1$  represents  $-\text{NH}-R^5-\text{NH}-$  or  $-\text{NH}-R^6-$  wherein  $R^5$  and  $R^6$   
independently represent a  $\text{C}_1$ - $\text{C}_{10}$  alkylene group, a  $-\text{C}(\text{O})\text{CH}_2-$ ,

-CH<sub>2</sub>C(O)-, a divalent benzene ring which may be substituted with Y, a divalent pyridine ring which may be substituted with Y, a divalent biphenyl group which may be substituted with Y, a divalent naphthalene ring which may be substituted with Y, a divalent thiophene ring which may be substituted with Y, a divalent pyrrole ring which may be substituted with Y, a furan ring which may be substituted with Y, or a condensed hetero ring which may be substituted with Y;

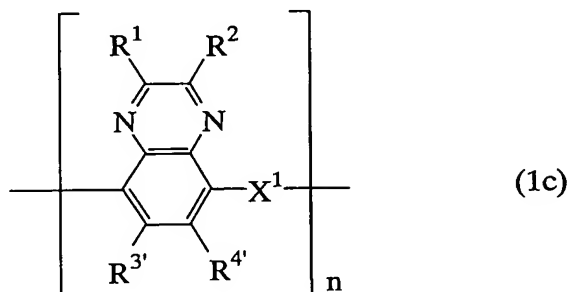
Y represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrrolyl group which may be substituted with Z, a furyl group which may be substituted with Z or a condensed heteroaryl group which may be substituted with Z provided that if Y is two or more in number, Y may be the same or different;

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group provided that if Z is two or more in number, Z may be the same or different; and

n is an integer of 2 or over.

16. An electrode for an energy storage device comprising a polyaminoquinoxaline compound of the following formula (1c) as an electrode active material

[Chemical Formula 16]



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wherein R<sup>1</sup> and R<sup>2</sup> independently represent a hydrogen atom, a hydroxyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y provided that when R<sup>1</sup> and R<sup>2</sup> are, respectively, the above-defined phenyl, pyridyl, biphenyl, naphthyl, thienyl, pyrrolyl, furyl or condensed heteroaryl group, these groups may be joined through a single bond;

R<sup>3'</sup> and R<sup>4'</sup> join together to form -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>S-, -SCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>SCH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>N(R')-, -N(R')CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>N(R')CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>OCH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>O-, -SCH<sub>2</sub>CH<sub>2</sub>S-, -OCH<sub>2</sub>CH<sub>2</sub>S-, -SCH<sub>2</sub>CH<sub>2</sub>O-, -CH<sub>2</sub>CH=CH-, -CH=CHCH<sub>2</sub>-, -OCH=CH-, -CH=CHO-, -SCH=CH-, -CH=CHS-, -N(R')CH=CH-, -CH=CHN(R')-, -OCH=N-, -N=CHO-, -SCH=N-, -N=CHS-, -N(R')CH=N-, -N=CHN(R')-, -N(R')N=CH-, -CH=N(R')N-, -CH=CHCH=CH-, -OCH<sub>2</sub>CH=CH-, -CH=CHCH<sub>2</sub>O-, -N=CHCH=CH-, -CH=CHCH=N-, -N=CHCH=N-, -N=CHN=CH-, or -CH=NCH=N- wherein a hydrogen atom bonded to a carbon atom of these groups may be substituted with Y, and R' represents a hydrogen atom, a

30

C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrrolyl group which may be substituted with Z, a furyl group which may be substituted with Z, or a condensed heteroaryl group which may be substituted with Z;

10 X<sup>1</sup> represents -NH-R<sup>5</sup>-NH- or -NH-R<sup>6</sup>- wherein R<sup>5</sup> and R<sup>6</sup> independently represent a C<sub>1</sub>-C<sub>10</sub> alkylene group, a -C(O)CH<sub>2</sub>-, -CH<sub>2</sub>C(O)-, a divalent benzene ring which may be substituted with Y, a divalent pyridine ring which may be substituted with Y, a divalent biphenyl group which may be substituted with Y, a divalent naphthalene ring which may be substituted with Y, a divalent thiophene ring which may be substituted with Y, a divalent pyrrole ring which may be substituted with Y, a furan ring which may be substituted with Y, or a condensed hetero ring which may be substituted with Y;

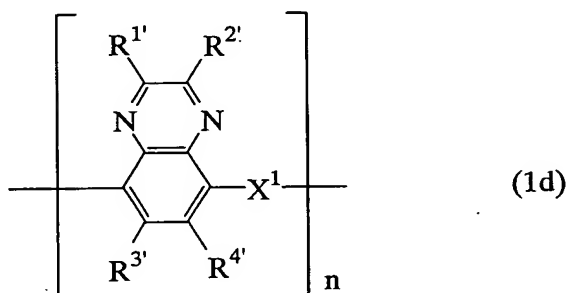
20 Y represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrrolyl group which may be substituted with Z, a furyl group which may be substituted with Z or a condensed heteroaryl group which may be substituted with Z provided that if Y is two or more in number, Y may be the same or different;

35 Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl

group or a condensed heteroaryl group provided that if Z is two or more in number, Z may be the same or different; and n is an integer of 2 or over.

- 5 17. An electrode for an energy storage device comprising a polyaminoquinoxaline compound of the following formula (1d) as an electrode active material

[Chemical Formula 17]



- 10 wherein R<sup>1'</sup> and R<sup>2'</sup> join together to form -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>O-,  
 -OCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>-, -OCH<sub>2</sub>O-, -CH<sub>2</sub>CH<sub>2</sub>S-, -SCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>SCH<sub>2</sub>-,  
 -CH<sub>2</sub>CH<sub>2</sub>N(R')-, -N(R')CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>N(R')CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-,  
 -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>OCH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>O-,  
 -OCH<sub>2</sub>CH<sub>2</sub>O-, -SCH<sub>2</sub>CH<sub>2</sub>S-, -OCH<sub>2</sub>CH<sub>2</sub>S-, -SCH<sub>2</sub>CH<sub>2</sub>O-, -CH<sub>2</sub>CH=CH-,  
 15 -CH=CHCH<sub>2</sub>-, -OCH=CH-, -CH=CHO-, -SCH=CH-, -CH=CHS-,  
 -N(R')CH=CH-, -CH=CHN(R')-, -OCH=N-, -N=CHO-, -SCH=N-,  
 -N=CHS-, -N(R')CH=N-, -N=CHN(R')-, -N(R')N=CH-, -CH=N(R')N-,  
 -CH=CHCH=CH-, -OCH<sub>2</sub>CH=CH-, -CH=CHCH<sub>2</sub>O-, -N=CHCH=CH-,  
 -CH=CHCH=N-, -N=CHCH=N-, -N=CHN=CH-, or -CH=NCH=N- wherein a  
 20 hydrogen atom bonded to a carbon atom of these groups may be  
 substituted with Y, and R' represents a hydrogen atom, a  
 C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub>  
 cyanoalkyl group, a phenyl group which may be substituted  
 with Z, a pyridyl group which may be substituted with Z, a  
 25 biphenyl group which may be substituted with Z, a naphthyl  
 group which may be substituted with Z, a thienyl group which  
 may be substituted with Z, a pyrrolyl group which may be  
 substituted with Z, a furyl group which may be substituted  
 with Z, or a condensed heteroaryl group which may be  
 30 substituted with Z;



$R^3$  and  $R^4$  join together to form  $-CH_2CH_2CH_2-$ ,  $-CH_2CH_2O-$ ,  
 $-OCH_2CH_2-$ ,  $-CH_2OCH_2-$ ,  $-OCH_2O-$ ,  $-CH_2CH_2S-$ ,  $-SCH_2CH_2-$ ,  $-CH_2SCH_2-$ ,  
 $-CH_2CH_2N(R')$ ,  $-N(R')CH_2CH_2-$ ,  $-CH_2N(R')CH_2-$ ,  $-CH_2CH_2CH_2CH_2-$ ,  
 $-CH_2CH_2CH_2O-$ ,  $-OCH_2CH_2CH_2-$ ,  $-CH_2CH_2OCH_2-$ ,  $-CH_2OCH_2CH_2-$ ,  $-CH_2OCH_2O-$ ,  
5  $-OCH_2CH_2O-$ ,  $-SCH_2CH_2S-$ ,  $-OCH_2CH_2S-$ ,  $-SCH_2CH_2O-$ ,  $-CH_2CH=CH-$ ,  
 $-CH=CHCH_2-$ ,  $-OCH=CH-$ ,  $-CH=CHO-$ ,  $-SCH=CH-$ ,  $-CH=CHS-$ ,  
 $-N(R')CH=CH-$ ,  $-CH=CHN(R')$ ,  $-OCH=N-$ ,  $-N=CHO-$ ,  $-SCH=N-$ ,  
 $-N=CHS-$ ,  $-N(R')CH=N-$ ,  $-N=CHN(R')$ ,  $-N(R')N=CH-$ ,  $-CH=N(R')N-$ ,  
 $-CH=CHCH=CH-$ ,  $-OCH_2CH=CH-$ ,  $-CH=CHCH_2O-$ ,  $-N=CHCH=CH-$ ,  
10  $-CH=CHCH=N-$ ,  $-N=CHCH=N-$ ,  $-N=CHN=CH-$ , or  $-CH=NCH=N-$  wherein a  
hydrogen atom bonded to a carbon atom of these groups may be  
substituted with Y, and  $R'$  represents a hydrogen atom, a  
 $C_1$ - $C_{10}$  alkyl group, a  $C_1$ - $C_{10}$  haloalkyl group, a  $C_1$ - $C_{10}$   
cyanoalkyl group, a phenyl group which may be substituted  
15 with Z, a pyridyl group which may be substituted with Z, a  
biphenyl group which may be substituted with Z, a naphthyl  
group which may be substituted with Z, a thienyl group which  
may be substituted with Z, a pyrrolyl group which may be  
substituted with Z, a furyl group which may be substituted  
20 with Z, or a condensed heteroaryl group which may be  
substituted with Z;

$X^1$  represents  $-NH-R^5-NH-$  or  $-NH-R^6-$  wherein  $R^5$  and  $R^6$   
independently represent a  $C_1$ - $C_{10}$  alkylene group, a  $-C(O)CH_2-$ ,  
 $-CH_2C(O)-$ , a divalent benzene ring which may be substituted  
25 with Y, a divalent pyridine ring which may be substituted  
with Y, a divalent biphenyl group which may be substituted  
with Y, a divalent naphthalene ring which may be substituted  
with Y, a divalent thiophene ring which may be substituted  
with Y, a divalent pyrrole ring which may be substituted with  
30 Y, a furan ring which may be substituted with Y, or a  
condensed hetero ring which may be substituted with Y;

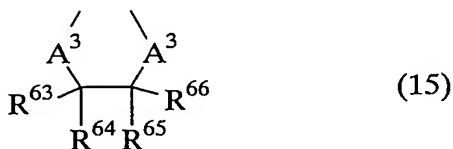
Y represents a halogen atom, a cyano group, a nitro  
group, an amino group, an epoxy group, a vinyl group, a  $C_1$ - $C_{10}$   
alkyl group, a  $C_1$ - $C_{10}$  haloalkyl group, a  $C_1$ - $C_{10}$  alkoxy group, a  
35  $C_1$ - $C_{10}$  cyanoalkyl group, a phenyl group which may be  
substituted with Z, a pyridyl group which may be substituted  
with Z, a biphenyl group which may be substituted with Z, a

naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrrolyl group which may be substituted with Z, a furyl group which may be substituted with Z or a condensed heteroaryl group which may be substituted with Z provided that if Y is two or more in number, Y may be the same or different;

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group provided that if Z is two or more in number, Z may be the same or different; and n is an integer of 2 or over.

18. The electrode according to claim 15 or 17, wherein the group formed by joining R<sup>1'</sup> and R<sup>2'</sup> together is of the formula (15)

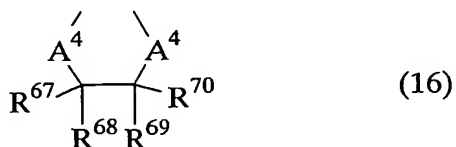
[Chemical Formula 18]



wherein A<sup>3</sup> represents O or S, and R<sup>63</sup>-R<sup>66</sup> independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z, in which Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group.

19. The electrode according to claim 16 or 17, wherein the group formed by joining R<sup>3'</sup> and R<sup>4'</sup> together is of the formula (16)

[Chemical Formula 19]

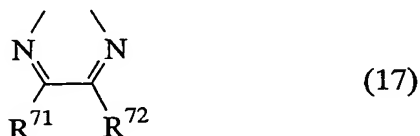


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wherein A<sup>4</sup> represents O or S, and R<sup>67</sup>-R<sup>70</sup> independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z, in which Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group.

20. The electrode according to claim 16 or 17, wherein the group formed by joining R<sup>3'</sup> and R<sup>4'</sup> is of the formula (17)

[Chemical Formula 20]



wherein R<sup>71</sup> and R<sup>72</sup> independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z or a thienyl group which may be substituted with Z, in which Z represents a halogen atom, a cyano group, a nitro group, an amino group,

an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed  
5 heteroaryl group.

21. An energy storage device comprising an electrode for an energy storage device according to any one of claims 1 to 20.

10

22. A method for making an electrode for an energy storage device according to claim 1, which method comprising applying and building up, on a current collector electrode, an electrode active material made of a polyaminoquinoxaline  
15 compound represented by the afore-indicated formula (1a).

20

23. A method for making an electrode for an energy storage device according to claim 15, which method comprising applying and building up, on a current collector electrode, an electrode active material made of a polyaminoquinoxaline  
compound represented by the afore-indicated formula (1b).

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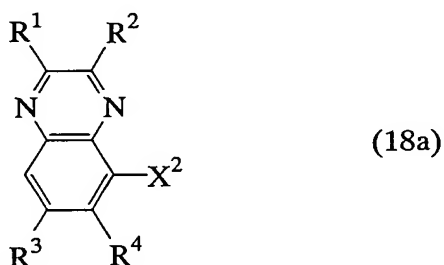
24. A method for making an electrode for an energy storage device according to claim 16, which method comprising applying and building up, on a current collector electrode, an electrode active material made of a polyaminoquinoxaline  
compound represented by the afore-indicated formula (1c).

30

25. A method for making an electrode for an energy storage device according to claim 17, which method comprising applying and building up, on a current collector electrode, an electrode active material made of a polyaminoquinoxaline  
compound represented by the afore-indicated formula (1d).

26. A method for making an electrode for an energy storage device as recited in claim 1 above, which method comprising electrolytically polymerizing an aminoquinoxaline compound represented by the formula (18a) on a current collector electrode,

[Chemical Formula 21]



wherein  $R^1$  and  $R^2$  independently represent a hydrogen atom, a hydroxyl group, a  $C_1$ - $C_{10}$  alkyl group, a  $C_1$ - $C_{10}$  alkoxy group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y provided that when  $R^1$  and  $R^2$  are, respectively, the above-defined phenyl, pyridyl, biphenyl, naphthyl, thienyl, pyrrolyl, furyl or condensed heteroaryl group, these groups may be joined through a single bond;

$R^3$  and  $R^4$  independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, a  $C_1$ - $C_{10}$  alkyl group, a  $C_1$ - $C_{10}$  alkoxy group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y provided that when  $R^3$  and  $R^4$  are, respectively, the above-defined phenyl, pyridyl,

biphenyl, naphthyl, thienyl, pyrrolyl, furyl or condensed heteroaryl group, these groups may be joined through a single bond;

$X^2$  represents  $-NH-R^{73}-NH_2$  or  $-NH-R^{74}$ , in which  $R^{73}$  represents a  $C_1-C_{10}$  alkylene group, a  $-C(O)CH_2-$ ,  $-CH_2C(O)-$ , a divalent benzene ring which may be substituted with Y, a divalent pyridine ring which may be substituted with Y, a divalent biphenyl group which may be substituted with Y, a divalent naphthalene ring which may be substituted with Y, a divalent thiophene ring which may be substituted with Y, a divalent pyrrole ring which may be substituted with Y, a furan ring which may be substituted with Y, or a condensed hetero ring which may be substituted with Y, and  $R^{74}$  a  $C_1-C_{10}$  alkyl group, an acetyl group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrrolyl group which may be substituted with Y, a furyl group which may be substituted with Y, or a condensed heteroaryl group which may be substituted with Y;

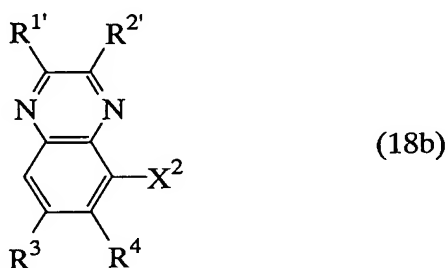
Y represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a  $C_1-C_{10}$  alkyl group, a  $C_1-C_{10}$  haloalkyl group, a  $C_1-C_{10}$  alkoxy group, a  $C_1-C_{10}$  cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrrolyl group which may be substituted with Z, a furyl group which may be substituted with Z or a condensed heteroaryl group which may be substituted with Z provided that if Y is two or more in number, Y may be the same or different; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a  $C_1-C_{10}$  alkyl group, a  $C_1-C_{10}$  haloalkyl group, a  $C_1-C_{10}$  alkoxy group, a  $C_1-C_{10}$  cyanoalkyl group, a phenyl group, a biphenyl group, a

naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group provided that if Z is two or more in number, Z may be the same or different.

27. A method for making an electrode for an energy storage device according to claim 15, which method comprising electrolytically polymerizing an aminoquinoxaline compound represented by the formula (18b) on a current collector electrode,

[Chemical Formula 22]



wherein R<sup>1'</sup> and R<sup>2'</sup> join together to form -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>-, -OCH<sub>2</sub>O-, -CH<sub>2</sub>CH<sub>2</sub>S-, -SCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>SCH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>N(R')-, -N(R')CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>N(R')CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>OCH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>O-, -SCH<sub>2</sub>CH<sub>2</sub>S-, -OCH<sub>2</sub>CH<sub>2</sub>S-, -SCH<sub>2</sub>CH<sub>2</sub>O-, -CH<sub>2</sub>CH=CH-, -CH=CHCH<sub>2</sub>-, -OCH=CH-, -CH=CHO-, -SCH=CH-, -CH=CHS-, -N(R')CH=CH-, -CH=CHN(R')-, -OCH=N-, -N=CHO-, -SCH=N-, -N=CHS-, -N(R')CH=N-, -N=CHN(R')-, -N(R')N=CH-, -CH=N(R')N-, -CH=CHCH=CH-, -OCH<sub>2</sub>CH=CH-, -CH=CHCH<sub>2</sub>O-, -N=CHCH=CH-, -CH=CHCH=N-, -N=CHCH=N-, -N=CHN=CH-, or -CH=NCH=N- wherein a hydrogen atom bonded to a carbon atom of these groups may be substituted with Y, and R' represents a hydrogen atom, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrrolyl group which may be substituted with Z, a furyl group which may be substituted

with Z, or a condensed heteroaryl group which may be substituted with Z;

R<sup>3</sup> and R<sup>4</sup> independently represent a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y provided that when R<sup>3</sup> and R<sup>4</sup> are, respectively, the above-defined phenyl, pyridyl, biphenyl, naphthyl, thienyl, pyrrolyl, furyl or condensed heteroaryl group, these groups may be joined through a single bond;

X<sup>2</sup> represents -NH-R<sup>73</sup>-NH<sub>2</sub> or -NH-R<sup>74</sup>, in which R<sup>73</sup> represents a C<sub>1</sub>-C<sub>10</sub> alkylene group, a -C(O)CH<sub>2</sub>-, -CH<sub>2</sub>C(O)-, a divalent benzene ring which may be substituted with Y, a divalent pyridine ring which may be substituted with Y, a divalent biphenyl group which may be substituted with Y, a divalent naphthalene ring which may be substituted with Y, a divalent thiophene ring which may be substituted with Y, a divalent pyrrole ring which may be substituted with Y, a furan ring which may be substituted with Y, or a condensed hetero ring which may be substituted with Y, and R<sup>74</sup> a C<sub>1</sub>-C<sub>10</sub> alkyl group, an acetyl group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrrolyl group which may be substituted with Y, a furyl group which may be substituted with Y, or a condensed heteroaryl group which may be substituted with Y;

Y represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a

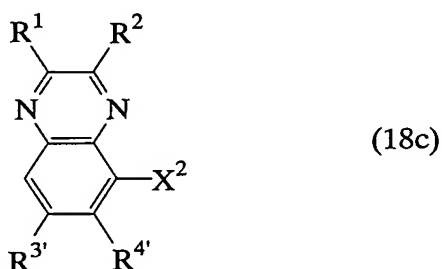


C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrrolyl group which may be substituted with Z, a furyl group which may be substituted with Z or a condensed heteroaryl group which may be substituted with Z provided that if Y is two or more in number, Y may be the same or different; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group provided that if Z is two or more in number, Z may be the same or different.

28. A method for making an electrode for an energy storage device according to claim 16, which method comprising electrolytically polymerizing an aminoquinoxaline compound represented by the formula (18c) on a current collector electrode,

[Chemical Formula 23]



wherein R<sup>1</sup> and R<sup>2</sup> independently represent a hydrogen atom, a hydroxyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted

with Y, a pyrrolyl group which may be substituted with Y, a furyl group which may be substituted with Y or a condensed heteroaryl group which may be substituted with Y provided that when R<sup>1</sup> and R<sup>2</sup> are, respectively, the above-defined phenyl, pyridyl, biphenyl, naphthyl, thienyl, pyrrolyl, furyl or condensed heteroaryl group, these groups may be joined through a single bond;

R<sup>3'</sup> and R<sup>4'</sup> join together to form -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>-, -OCH<sub>2</sub>O-, -CH<sub>2</sub>CH<sub>2</sub>S-, -SCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>SCH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>N(R')-, -N(R')CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>N(R')CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>OCH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>O-, -SCH<sub>2</sub>CH<sub>2</sub>S-, -OCH<sub>2</sub>CH<sub>2</sub>S-, -SCH<sub>2</sub>CH<sub>2</sub>O-, -CH<sub>2</sub>CH=CH-, -CH=CHCH<sub>2</sub>-, -OCH=CH-, -CH=CHO-, -SCH=CH-, -CH=CHS-, -N(R')CH=CH-, -CH=CHN(R')-, -OCH=N-, -N=CHO-, -SCH=N-, -N=CHS-, -N(R')CH=N-, -N=CHN(R')-, -N(R')N=CH-, -CH=N(R')N-, -CH=CHCH=CH-, -OCH<sub>2</sub>CH=CH-, -CH=CHCH<sub>2</sub>O-, -N=CHCH=CH-, -CH=CHCH=N-, -N=CHCH=N-, -N=CHN=CH-, or -CH=NCH=N- wherein a hydrogen atom bonded to a carbon atom of these groups may be substituted with Y, and R' represents a hydrogen atom, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrrolyl group which may be substituted with Z, a furyl group which may be substituted with Z, or a condensed heteroaryl group which may be substituted with Z;

X<sup>2</sup> represents -NH-R<sup>73</sup>-NH<sub>2</sub> or -NH-R<sup>74</sup>, in which R<sup>73</sup> represents a C<sub>1</sub>-C<sub>10</sub> alkylene group, a -C(O)CH<sub>2</sub>-, -CH<sub>2</sub>C(O)-, a divalent benzene ring which may be substituted with Y, a divalent pyridine ring which may be substituted with Y, a divalent biphenyl group which may be substituted with Y, a divalent naphthalene ring which may be substituted with Y, a divalent thiophene ring which may be substituted with Y, a divalent pyrrole ring which may be substituted with Y, a furan ring which may be substituted with Y, or a condensed

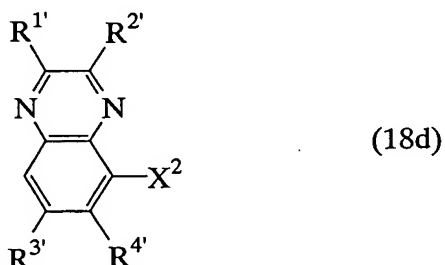
hetero ring which may be substituted with Y, and R<sup>74</sup> a C<sub>1</sub>-C<sub>10</sub> alkyl group, an acetyl group, a phenyl group which may be substituted with Y, a pyridyl group which may be substituted with Y, a biphenyl group which may be substituted with Y, a naphthyl group which may be substituted with Y, a thienyl group which may be substituted with Y, a pyrrolyl group which may be substituted with Y, a furyl group which may be substituted with Y, or a condensed heteroaryl group which may be substituted with Y;

Y represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrrolyl group which may be substituted with Z, a furyl group which may be substituted with Z or a condensed heteroaryl group which may be substituted with Z provided that if Y is two or more in number, Y may be the same or different; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group provided that if Z is two or more in number, Z may be the same or different.

29. A method for making an electrode for an energy storage device according to claim 17, which method comprising electrolytically polymerizing an aminoquinoxaline compound represented by the formula (18d) on a current collector electrode,

[Chemical Formula 24]



wherein R<sup>1'</sup> and R<sup>2'</sup> join together to form -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>-, -OCH<sub>2</sub>O-, -CH<sub>2</sub>CH<sub>2</sub>S-, -SCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>SCH<sub>2</sub>-,  
 10 -CH<sub>2</sub>CH<sub>2</sub>N(R')-, -N(R')CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>N(R')CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-,  
 -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>O-, -OCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>OCH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>O-,  
 -OCH<sub>2</sub>CH<sub>2</sub>O-, -SCH<sub>2</sub>CH<sub>2</sub>S-, -OCH<sub>2</sub>CH<sub>2</sub>S-, -SCH<sub>2</sub>CH<sub>2</sub>O-, -CH<sub>2</sub>CH=CH-,  
 -CH=CHCH<sub>2</sub>-, -OCH=CH-, -CH=CHO-, -SCH=CH-, -CH=CHS-,  
 -N(R')CH=CH-, -CH=CHN(R')-, -OCH=N-, -N=CHO-, -SCH=N-,  
 15 -N=CHS-, -N(R')CH=N-, -N=CHN(R')-, -N(R')N=CH-, -CH=N(R')N-,  
 -CH=CHCH=CH-, -OCH<sub>2</sub>CH=CH-, -CH=CHCH<sub>2</sub>O-, -N=CHCH=CH-,  
 -CH=CHCH=N-, -N=CHCH=N-, -N=CHN=CH-, or -CH=NCH=N- wherein a  
 hydrogen atom bonded to a carbon atom of these groups may be  
 substituted with Y, and R' represents a hydrogen atom, a  
 20 C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub>  
 cyanoalkyl group, a phenyl group which may be substituted  
 with Z, a pyridyl group which may be substituted with Z, a  
 biphenyl group which may be substituted with Z, a naphthyl  
 group which may be substituted with Z, a thienyl group which  
 25 may be substituted with Z, a pyrrolyl group which may be  
 substituted with Z, a furyl group which may be substituted  
 with Z, or a condensed heteroaryl group which may be  
 substituted with Z;

R<sup>3'</sup> and R<sup>4'</sup> join together to form -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>O-,  
 30 -OCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>OCH<sub>2</sub>-, -OCH<sub>2</sub>O-, -CH<sub>2</sub>CH<sub>2</sub>S-, -SCH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>SCH<sub>2</sub>-,  
 -CH<sub>2</sub>CH<sub>2</sub>N(R')-, -N(R')CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>N(R')CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-,

$-\text{CH}_2\text{CH}_2\text{CH}_2\text{O}-$ ,  $-\text{OCH}_2\text{CH}_2\text{CH}_2-$ ,  $-\text{CH}_2\text{CH}_2\text{OCH}_2-$ ,  $-\text{CH}_2\text{OCH}_2\text{CH}_2-$ ,  $-\text{CH}_2\text{OCH}_2\text{O}-$ ,  
 $-\text{OCH}_2\text{CH}_2\text{O}-$ ,  $-\text{SCH}_2\text{CH}_2\text{S}-$ ,  $-\text{OCH}_2\text{CH}_2\text{S}-$ ,  $-\text{SCH}_2\text{CH}_2\text{O}-$ ,  $-\text{CH}_2\text{CH}=\text{CH}-$ ,  
 $-\text{CH}=\text{CHCH}_2-$ ,  $-\text{OCH}=\text{CH}-$ ,  $-\text{CH}=\text{CHO}-$ ,  $-\text{SCH}=\text{CH}-$ ,  $-\text{CH}=\text{CHS}-$ ,  
 $-\text{N}(\text{R}')\text{CH}=\text{CH}-$ ,  $-\text{CH}=\text{CHN}(\text{R}')-$ ,  $-\text{OCH}=\text{N}-$ ,  $-\text{N}=\text{CHO}-$ ,  $-\text{SCH}=\text{N}-$ ,  
5  $-\text{N}=\text{CHS}-$ ,  $-\text{N}(\text{R}')\text{CH}=\text{N}-$ ,  $-\text{N}=\text{CHN}(\text{R}')-$ ,  $-\text{N}(\text{R}')\text{N}=\text{CH}-$ ,  $-\text{CH}=\text{N}(\text{R}')\text{N}-$ ,  
 $-\text{CH}=\text{CHCH}=\text{CH}-$ ,  $-\text{OCH}_2\text{CH}=\text{CH}-$ ,  $-\text{CH}=\text{CHCH}_2\text{O}-$ ,  $-\text{N}=\text{CHCH}=\text{CH}-$ ,  
 $-\text{CH}=\text{CHCH}=\text{N}-$ ,  $-\text{N}=\text{CHCH}=\text{N}-$ ,  $-\text{N}=\text{CHN}=\text{CH}-$ , or  $-\text{CH}=\text{NCH}=\text{N}-$  wherein a  
hydrogen atom bonded to a carbon atom of these groups may be  
substituted with Y, and R' represents a hydrogen atom, a  
10  $\text{C}_1$ - $\text{C}_{10}$  alkyl group, a  $\text{C}_1$ - $\text{C}_{10}$  haloalkyl group, a  $\text{C}_1$ - $\text{C}_{10}$   
cyanoalkyl group, a phenyl group which may be substituted  
with Z, a pyridyl group which may be substituted with Z, a  
biphenyl group which may be substituted with Z, a naphthyl  
group which may be substituted with Z, a thienyl group which  
15 may be substituted with Z, a pyrrolyl group which may be  
substituted with Z, a furyl group which may be substituted  
with Z, or a condensed heteroaryl group which may be  
substituted with Z;  
 $\text{X}^2$  represents  $-\text{NH}-\text{R}^{73}-\text{NH}_2$  or  $-\text{NH}-\text{R}^{74}$ , in which  $\text{R}^{73}$   
20 represents a  $\text{C}_1$ - $\text{C}_{10}$  alkylene group, a  $-\text{C}(\text{O})\text{CH}_2-$ ,  $-\text{CH}_2\text{C}(\text{O})-$ , a  
divalent benzene ring which may be substituted with Y, a  
divalent pyridine ring which may be substituted with Y, a  
divalent biphenyl group which may be substituted with Y, a  
divalent naphthalene ring which may be substituted with Y, a  
25 divalent thiophene ring which may be substituted with Y, a  
divalent pyrrole ring which may be substituted with Y, a  
furan ring which may be substituted with Y, or a condensed  
hetero ring which may be substituted with Y, and  $\text{R}^{74}$  a  $\text{C}_1$ - $\text{C}_{10}$   
alkyl group, an acetyl group, a phenyl group which may be  
30 substituted with Y, a pyridyl group which may be substituted  
with Y, a biphenyl group which may be substituted with Y, a  
naphthyl group which may be substituted with Y, a thienyl  
group which may be substituted with Y, a pyrrolyl group which  
may be substituted with Y, a furyl group which may be  
35 substituted with Y, or a condensed heteroaryl group which may  
be substituted with Y;

Y represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group which may be substituted with Z, a pyridyl group which may be substituted with Z, a biphenyl group which may be substituted with Z, a naphthyl group which may be substituted with Z, a thienyl group which may be substituted with Z, a pyrrolyl group which may be substituted with Z, a furyl group which may be substituted with Z or a condensed heteroaryl group which may be substituted with Z provided that if Y is two or more in number, Y may be the same or different; and

Z represents a halogen atom, a cyano group, a nitro group, an amino group, an epoxy group, a vinyl group, a C<sub>1</sub>-C<sub>10</sub> alkyl group, a C<sub>1</sub>-C<sub>10</sub> haloalkyl group, a C<sub>1</sub>-C<sub>10</sub> alkoxy group, a C<sub>1</sub>-C<sub>10</sub> cyanoalkyl group, a phenyl group, a biphenyl group, a naphthyl group, a thienyl group, a pyrrolyl group, a furyl group or a condensed heteroaryl group provided that if Z is two or more in number, Z may be the same or different.